



Intel® Pentium® 4 Processor and Microsoft* Windows* XP Professional:

Exploiting Innovation to Gain
a Competitive Edge

*Combine Intel's most advanced desktop processor
with Microsoft's latest business desktop operating
system and you've got a powerful platform that helps
companies enhance business effectiveness, helps
companies make the most of emerging technologies,
and boosts the reliability, stability and manageability
of the enterprise infrastructure.*

intel®

Gone are the days when IT was just another cost center. Today's decision makers understand that IT plays a strategic role in business success and that technology choices are critical to both employee productivity and organizational effectiveness. Companies that exploit innovation—including the steep technology improvement curve of the PC industry—can make their organizations faster, more agile and more competitive. Those that cling to old technologies lose the edge the latest innovations can bring and waste valuable support dollars maintaining obsolete software and systems.

In a climate of uncertainty, change and cost pressures, every company needs the most robust, reliable infrastructure it can afford—not to mention infrastructure that enhances the organization's ability to adapt quickly and compete effectively. That's why many business leaders are upgrading to Microsoft's latest desktop operating system, Microsoft® Windows® XP Professional, and are running it on desktop PCs powered by state-of-the-art Intel® Pentium® 4 processors.

What Do You Get with the Intel® Pentium® 4 Processor and Microsoft® Windows® XP Professional?

- An ultra-responsive user experience, even in heavy multitasking environments.
- Great support for new usage models like XML-based Web services and peer-to-peer information sharing.
- Added performance for 3D rendering, security and networking.
- Rock-solid reliability and stability for non-stop business computing.
- A more robust, manageable environment.
- Superb performance and quality on new, Microsoft® Windows® XP Professional-enabled rich media capabilities like Microsoft® Windows® Messenger®.

Made for Each Other

Windows XP Professional is tailored to the demands of a fast-paced, interconnected business world. Expanding on the proven and powerful code base of Microsoft® Windows® 2000, this new operating system offers an array of capabilities that put the advanced productivity tools of the digital age at your employees' fingertips. Windows XP Professional also raises the bar for efficient, reliable computing and delivers new tools for managing, deploying and supporting your desktop systems.

The Pentium 4 processor is the perfect foil for Windows XP Professional. Built for today's multitasking environments and tomorrow's newest technologies, the Pentium 4 processor provides a powerful platform not just for next-generation operating systems like Windows XP Professional but for all the latest productivity packages, business applications and Internet-enabled capabilities.

As if that weren't enough, the Pentium 4 processor and Windows XP Professional are made for each other—literally. The Pentium 4 processor has an all-new Intel® NetBurst™ microarchitecture, designed expressly for top performance on emerging software capabilities. With its extensive use of rich media and the Extensible Markup Language (XML), Windows XP Professional embodies those capabilities. The operating system also includes numerous features that are optimized to take advantage of the Pentium 4 processor's microarchitecture.

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including the steep technology improvement curve of the PC industry—can make their organizations faster, more agile and more competitive. Those that cling to old technologies lose the edge the latest innovations can bring and waste valuable support dollars maintaining obsolete software and systems.

As a result, deploying the Pentium 4 processor and Windows XP Professional can make your PCs more powerful, your employees more productive, your infrastructure more robust—even help your company become more profitable. Among the advantages that accrue to businesses who choose Pentium 4 processor-powered PCs and Windows XP Professional:

- Powerful hardware and software architectures deliver an ultra-responsive user experience, even in today's heavy multitasking environments.
- With outstanding performance plus built-in software support, employees are primed to make the most of XML, Web services, peer-to-peer collaboration and other new usage models.
- Windows XP Professional with Intel Pentium 4 processor-specific optimizations give an added boost to 3D rendering, security and networking.
- Intel's renowned stability and reliability plus Windows XP Professional's dependability enhancements create a rock-solid foundation for business computing.
- The environment grows more manageable as Windows XP Professional's new management tools are enhanced by the Pentium 4 processor's power to run them without slowing user productivity.
- Organizations communicate and collaborate more effectively as users take advantage of awesome performance and quality on the new, real-time communication experiences enabled by Microsoft® Windows® Messenger®, as well as other Windows XP-enabled rich media capabilities.
- Matching the latest processor technology with the latest operating system provides extensive flexibility and headroom that reduce disruptive technology transitions and enhance business agility.

The Intel® Pentium® 4 processor

delivers an outstanding base for any desktop computing challenge. Microsoft® Windows® XP Professional builds on that base. Together, they deliver a powerful business computing platform for today's multitasking environments and tomorrow's emerging usage models.

Powerful Upgrades to Performance and Productivity

Upgrading your installed base of PCs with the Intel® Pentium® 4 processor and Microsoft® Windows® XP Professional delivers dramatic, user-noticeable improvements in performance and responsiveness, as the results of these benchmark tests demonstrate. Developed by the Business Applications Performance Corporation*

(BAPCo), the SYSmark® 2001 and WebMark® 2001 benchmarks use real-world applications and typical user scenarios to give IT decision-makers an accurate gauge for predicting anticipated performance improvements. Both benchmarks show that Windows XP Professional on a 2 GHz Intel Pentium 4 processor delivers more than a 2.5x speed-up over Microsoft® Windows® 98 SE on a 500 MHz Intel® Pentium® III processor.

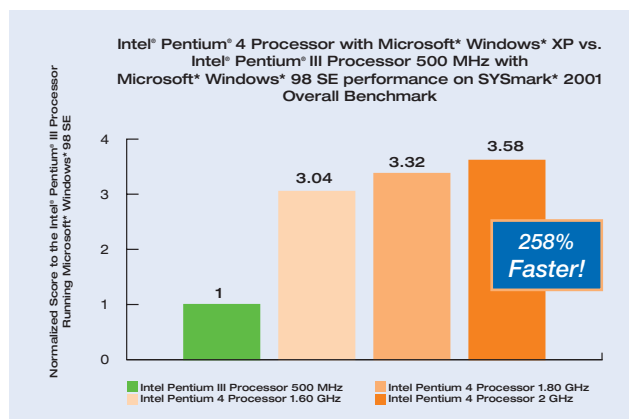


Figure 1: BAPCo's SYSmark® 2001 benchmark shows Windows XP Professional runs 258% faster on a 2 GHz Intel® Pentium® 4 processor than Microsoft® Windows® 98 SE does on a 500 MHz Intel® Pentium® III processor.

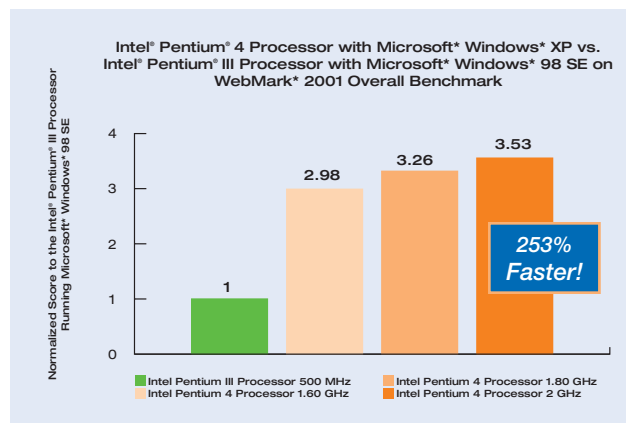


Figure 2: The WebMark® 2001 benchmark shows a similar performance boost—253% faster.

Intel® Pentium® 4 Processor: Designed for the State of the Art

The Intel® Pentium® 4 processor is Intel's most powerful 32-bit processor and a revolutionary advance over previous generations. At its heart is the Intel® NetBurst™ micro-architecture, plus an expanded set of 144 new instructions. The new processor was designed by Intel's technology experts following an extensive process in which cross-disciplinary teams studied emerging technologies and worked with industry visionaries to identify computing trends and determine how a next-generation processor could best support them.

The resulting implementation takes a multi-pronged approach to delivering breakthrough performance. It uses advanced, hyper-pipelined technology, with an instruction pipeline double that of previous Intel desktop processors, to support dramatically higher clock frequencies—up to 2 GHz and rising. A 20-stage branch prediction and recovery pipeline provides another big boost, and a sophisticated rapid execution engine doubles the effective speed of critical instructions by providing arithmetic units that execute two instructions for each beat of the processor's clock. A 400 MHz system bus—triple the speed of the Intel® Pentium® III processor's bus—combines with an execution trace cache and a state-of-the-art dynamic execution engine to quickly provide instructions and data to the processor's high performance execution units and keep them busy executing code.

In addition to the microarchitecture, a major expansion of the Intel architecture instruction set gives software developers powerful new ways to compactly represent data sets and operate on them efficiently. These Streaming SIMD Extensions 2 (SSE2) code instructions reduce the number of instructions needed to execute a particular program task, accelerating applications ranging from video, speech and image processing to data encryption and financial modeling.

With this sophisticated architecture, the Intel Pentium 4 processor delivers an outstanding base for any desktop computing challenge. Microsoft® Windows® XP Professional builds on that base. Together, these two technologies deliver a powerful business computing platform for today's multitasking environments and tomorrow's emerging usage models.

Under the Hood: Intel® Pentium® 4 Processing Power, Microsoft® Windows® XP Professional Optimizations

Some aspects of the Intel® Pentium® 4 processor's architecture, like high clock speeds, give virtually all applications a boost. Intel also builds in a wide variety of instructions and enhancements that software developers can take advantage of if they choose. Microsoft® Windows® XP Professional uses many of these, delivering additional performance advantages. Among the architectural features Windows XP Professional utilizes:

- An expanded instruction set with 144 new Streaming SIMD Extensions 2 (SSE2), enabling the hundreds of applications that use SSE2 to exploit the performance benefits of these instructions.
- An extended machine check feature that helps IT staff diagnose and troubleshoot hardware component failures.
- "Fast system call" instructions, allowing the processor and operating system to speed communications.
- Multi-level cache memory, for improved user responsiveness.
- Instructions that accelerate TCP/IP networking and FTP processing, netting faster file transfers and improved responsiveness in enterprise network environments.

Power for the Multitasking Office

Business is more deadline-driven than ever. Information bombards us from all sides. To keep up, employees jump among numerous applications, each as computation intensive as the last. At the same time, IT managers are finding they can exploit the power of high-performance desktops to make their entire infrastructure sturdier, safer and more streamlined. The net effect is that tasks such as virus checking, data encryption/decryption and compression/decompression are running in the background, while in the foreground users are working with several power-hungry applications simultaneously.

Windows XP Professional's new Preemptive Multitasking Environment is designed for this trend, improving system response times and stability when multiple applications run simultaneously. Windows XP Professional also adds to the multitasking workload, since it runs a wide range of manageability and security features as transparent background tasks.

The Intel Pentium 4 processor's fast clock speeds and Intel NetBurst microarchitecture offer high-powered support for multitasking environments. Its Rapid Execution Engine, hyper-pipelined technologies and 400 MHz system bus keep the system highly responsive even when users run multiple foreground applications and background tasks. This advanced architecture produces measurable improvements in productivity. And by providing desktop power for background processing, it enhances the security and health of the enterprise infrastructure.

Power for Visual Business Computing and Emerging Usage Models

In an increasingly interconnected and competitive business world, finding ways to accelerate decision-making, streamline the supply chain, and collaborate more effectively can give companies a decisive edge. Next-generation technologies and usage models are providing just such an edge, and both the Pentium 4 processor and the Windows XP Professional operating system have been designed to unleash the power of these new capabilities.

For example, Business Analysis and Visualization (BAV) applications make it easier to analyze complex data sets, identify patterns, gain insight and communicate the results, all of which help organizations improve and speed up their decision processes. Web services based on industry standards such as the Extensible Markup Language (XML) and the Simple Object Access Protocol (SOAP) are opening the door to a huge and potent array of ways to integrate business processes and wring inefficiencies out of the supply chain. Peer-to-peer computing models facilitate information sharing as they enable companies to capture otherwise unused computing resources.

Windows XP Professional supports these new technologies and takes full advantage of them. The operating system offers XML-based Web services such as Remote Assistance and the Web

Supercharging Productivity 2X

BAPCo's SYSmark® 2001 benchmark models the workload of a typical office user, including the time needed to perform common productivity operations—check email, query a database, browse the Web, manipulate images or create Web animations. The benchmark also takes into account such processes as file compression and virus detection, which often run automatically in the background, yet can affect system responsiveness on a less-than-optimally-powered PC.

SYSmark testing shows that using Microsoft® Windows® XP Professional and a high-speed Intel® Pentium® 4 processor produces more than a twofold performance increase for this typical productivity scenario compared to Microsoft® Windows® 98 SE on an Intel® Pentium® III processor.

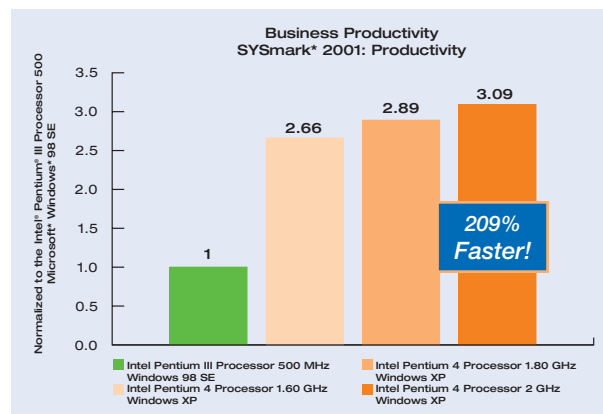


Figure 3: Microsoft® Windows® XP Professional and a 2 GHz Intel® Pentium® 4 processor handle typical productivity operations, including background tasks, twice as fast as Microsoft® Windows® 98 SE on a 500 MHz Intel® Pentium® III processor.

Publishing Wizard, which enhance user productivity and business effectiveness. Windows XP Professional includes Microsoft® Windows® Media Player® 8, which brings together common digital media activities into a single interface and makes it easier to incorporate digital media into business activities. The operating system offers intrinsic support for peer-to-peer networking to give businesses greater flexibility in adopting this model. And Microsoft® Windows® Messenger® delivers breakthrough power and convenience in real-time business communications using high quality video, audio, text and documents.

Since the Intel® Pentium® 4 processor is designed for advanced technologies, it's not surprising that it delivers optimum performance for them. Compared to an Intel® Pentium® III processor at 500 MHz, a Pentium 4 processor at 2 GHz delivers 218% faster parsing of XML, as well as encoding increases of 312% for Microsoft® Windows® Media Encoder*. Consequently, users can more quickly take advantage of advanced services, and rich visual applications look, sound and perform their best.

3X Faster for Sharing and Collaboration

WebMark® 2001 is a benchmark tool for evaluating Internet performance from a user's perspective. The WebMark workload combines a range of popular and emerging Internet technologies. In particular, its Business (B) portion models a collaborative corporate intranet Web site where employees are creating a group presentation and sharing information across a network using such applications as Microsoft® Word®, Microsoft® PowerPoint®, Microsoft® Excel®, Microsoft® Windows® Media Encoder* and Microsoft® NetMeeting*.

Reflecting the fact that they're both designed for precisely these types of applications, Microsoft® Windows® XP Professional and the Intel® Pentium® 4 processor deliver steep speedups—as much as triple the performance of Microsoft® Windows® 98 SE on a 500 MHz Intel® Pentium® III processor.

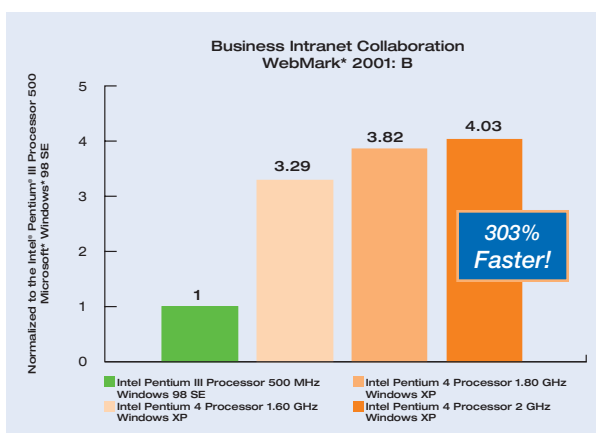


Figure 4: Optimized for the next-generation Internet, the Intel® Pentium® 4 processor with Microsoft® Windows® XP Professional delivers up to a 303% increase over a 500 MHz Intel® Pentium® III processor and Microsoft® Windows® 98 SE.

Power for a Reliable, Stable Environment

Microsoft® Windows® 2000 was a major advance in operating system reliability. Microsoft® Windows® XP Professional builds on the Windows 2000 foundation, enhancing its outstanding stability with advances such as a CryptoAPI architecture for improved security, a new Microsoft® Windows® Installer and a Remote Assistance feature that lets IT staff remotely take over a user's PC and correct problems. These new features deliver a dependable computing experience that minimizes user reboots, reduces deployment headaches and enhances the enterprise's security and manageability.

For businesses that are still running Microsoft® Windows® 98 or Microsoft® Windows® 95, Windows XP Professional's robustness and reliability are strong arguments for upgrading. In addition, Windows XP Professional is reported to be even more backward-compatible with earlier Windows applications than Windows 2000 is—another incentive for companies currently running older Microsoft operating systems to make the switch.

The Intel Pentium 4 processor reinforces the operating system's integrity. Intel's standard-setting expertise in chip design, development, manufacturing, validation and testing make the Pentium 4 processor a model of quality and reliability. In addition, Intel works with major PC manufacturers to deliver stable platforms and offer transition guidance that helps businesses plan for easy, cost-effective technology transitions.

When the Latest and Greatest Is Also the Smartest

Few companies can justify buying the latest and greatest technology for its own sake, especially in today's bottom-line-oriented business climate. But when new technologies can make organizations more productive and streamlined and their infrastructures more robust and reliable, those technologies represent a solid investment.

Desktop business PCs powered by the Pentium 4 processor and the Windows XP Professional operating system are outstanding examples of technology advances that are easy to cost-justify. Each technology individually is a strong solution to the critical business need for powerful, robust infrastructure. Together, their

high performance hardware and software architectures create a synergy that enhances the benefits of each.

By deploying these two powerhouse technologies together, companies gain a powerful business engine that's ready for whatever challenges tomorrow brings. They can enhance user productivity with a platform designed for the way we work today—and the way we'll work tomorrow. At the same time, they can improve the stability and robustness of their IT

environment while improving IT productivity. In doing so, they gain the freedom to focus on the business, and the headroom and flexibility to increase their organizational agility and gain a competitive edge.

Learn more about how to put the performance and productivity of the Intel Pentium 4 processor and Windows XP Professional to work for your business. Visit us at:

www.intel.com/eBusiness/products/desktop

Matching It Up: Synergy Between the Intel® Pentium® 4 Processor and Microsoft® Windows® XP		
Windows XP Provides...	Intel Pentium 4 Processor Delivers...	So Your Business Can...
<ul style="list-style-type: none"> Preemptive multitasking architecture 	<ul style="list-style-type: none"> Performance to keep systems responsive, even when users run several demanding applications simultaneously 	<ul style="list-style-type: none"> Enhance employee productivity Maximize system longevity
<ul style="list-style-type: none"> Peer-to-peer networking support 	<ul style="list-style-type: none"> Power to host applications and files efficiently without draining system responsiveness 	<ul style="list-style-type: none"> Make better use of enterprise-wide computing resources
<ul style="list-style-type: none"> Web services and .NET* services based on native XML and SOAP support 	<ul style="list-style-type: none"> Superb performance at parsing XML statements Power to run Web services along with other user tasks 	<ul style="list-style-type: none"> Realize outstanding productivity for capabilities such as Remote Assistance, Microsoft® Windows® Messenger* and the Web Publishing Wizard
<ul style="list-style-type: none"> Comprehensive digital media activities under a single, easy-to-use umbrella – Microsoft® Windows® Media Player® 8 3D graphics optimized for the Intel® Pentium® 4 processor 	<ul style="list-style-type: none"> Powerful Intel® NetBurst™ microarchitecture and 144 new Streaming SIMD Extensions 2 (SSE2), providing breakthrough performance for digital media speed and quality 	<ul style="list-style-type: none"> Enhance productivity Enjoy high quality audio and video experiences Benefit from improved decision making with business analysis and visualization tools Use digital media to communicate effectively, train employees, improve customer service and more
<ul style="list-style-type: none"> Microsoft Windows Messenger for advanced collaboration with real-time audio- and video-conferencing, application sharing and text-based chat 	<ul style="list-style-type: none"> Intel NetBurst microarchitecture and SSE2 instructions, to enhance video and audio decoding and other media-rich software 	<ul style="list-style-type: none"> Collaborate more effectively with supply chain partners and customers Enhance productivity Use digital media more easily and effectively Experience higher quality PC-to-PC phone calls
<ul style="list-style-type: none"> Operating system support for applications that use SSE and SSE2 instructions 	<ul style="list-style-type: none"> SSE2 instructions optimized for next-generation tools and technologies 	<ul style="list-style-type: none"> Fully benefit from popular business software designed to use advanced Pentium 4 processor features
<ul style="list-style-type: none"> Encrypting File System (EFS), IPsec and Kerberos support 	<ul style="list-style-type: none"> Special instructions to speed 128-bit integer operations typically used in encryption, authentication and other security-related capabilities 	<ul style="list-style-type: none"> Protect corporate data and resources Reduce the risk of data theft Run background security tasks on the desktop without affecting user productivity
<ul style="list-style-type: none"> Reliability features such as improved code correction, Windows file protection and reduced reboot scenarios 	<ul style="list-style-type: none"> State-of-the-art design, manufacturing and test facilities for outstanding system availability and lower support costs 	<ul style="list-style-type: none"> Avoid disruptions and improve user experience
<ul style="list-style-type: none"> Manageability enhancements like Remote Desktop, System Restore, and Recovery Console 	<ul style="list-style-type: none"> Power to run management tools in the background while maintaining performance on users' foreground applications Built-in support for industry-standard manageability features such as ACPI, LAN-based remote wake-up and preboot execution environment (PXE) 	<ul style="list-style-type: none"> Improve manageability Minimize downtime and boost productivity Reduce total costs of ownership (TCO)
<ul style="list-style-type: none"> Enhanced device driver verifier and Microsoft® Windows® Installer 	<ul style="list-style-type: none"> Platform elements optimized for compatibility and stability 	<ul style="list-style-type: none"> Reduce support costs by qualifying and deploying new client systems more efficiently and minimizing disruptive transitions

*Source: Intel. Configuration: **Intel® Pentium® 4 processor at 1.60 GHz, 1.80 GHz, and 2 GHz** – Intel® Desktop Board D850MD, 256 MB PC800 RDRAM – 45, Intel® chipset INF file v3.20.1008, Intel® Application Accelerator 1.1; **Intel® Pentium® III processor at 500 MHz** – Intel® Desktop Board 440BX-2, 128 MB PC100 CL2 SDRAM, IBM® 18GB ATA-66 DJNA-371800 Hard Drive; Microsoft® default DMA on, Diamond® Viper V550 with 2x nVidia TNT® chipset; **Windows® 98 SE Platform** – nVidia Detonator® driver 3.68 for Windows 98 SE; **Windows® XP Platform** – IBM® 30GB ATA-100 DTLA-307030 Hard Drive, Leadtek® WinFast GeForce® 3/nVidia® GeForce 3 4x AGP Graphics, nVidia Detonator v12.41 Graphics Driver, DirectX® 8.1(4.08.01.0810), 100 Mbps Intel Pro/100+ Management PCI LAN Card, Microsoft® Windows® XP Professional Edition (RTM): Visual Effects OFF, System Restore OFF, Windows Update OFF, Power Management OFF. *Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance.**

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